*The*
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## A PLEA FOR PLANNING

THERE is a growing awareness of the need for health education. Leaders of all professional groups are giving more and more attention to the contribution it can make to individual and national well-being. And many pioneer workers are increasingly seeking and developing the opportunities that occur in their daily work. Nowhere in Britain, however, is there a community-wide, integrated programme of health education. There is much goodwill, a fairly general interest, and, here and there, enthusiastic individual missionary effort. But, on the whole, health education is opportunist, unco-ordinated and sporadic rather than planned, systematic and sustained.

Since health education tends to be overshadowed by more pressing matters, this is not surprising. Where no-one is responsible, little is done. So every local health authority should appoint a suitable person to survey the health education needs and opportunities in the area ; to gain the interest and support of all influential groups ; to draw up a comprehensive plan with their help ; to provide the steady drive that will give life and force to the paper plan ; and to supervise and co-ordinate the whole scheme.

Although, of course, there should be the closest possible liaison between the health and education departments, the officer appointed should probably be on the staff of the Medical Officer of Health. He might well be called "Health Education Officer," and ideally should be wholly engaged in this work. He should not be expected to do all the health education himself, however. Indeed he should be judged less by the number of lectures he gives and the quantity of posters and leaflets he distributes than by his success in inspiring others and seeing that they are properly trained, supported and equipped.

In the same way, those teachers, nurses, sanitary inspectors, youth leaders, welfare and social workers, and doctors who are already doing all the health teaching they can in the course of their ordinary work should undertake similar planning duties in their own sphere or group, and try to multiply their influence by gaining the active help and participation of their colleagues. Thus, starting at the top of the community, and then at the top of each leadership group, there will grow and spread a concept of health education not as propaganda, not even as a subject to be learned by rote, but as a way of life to be lived and demonstrated as well as taught.

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# OCCUPATION AND HEALTH

By Professor Ronald E. Lane, F.R.C.P., *Chair of Occupational Health, University of Manchester.*

There is some truth in the criticism often levelled at the doctor that he is more interested in disease than in health, and it must be admitted that in the past he has often been willing to wait for the patient to come to him with an illness which has resulted from living or working conditions that he has done nothing to change. The reason for this is not far to seek, however, for the doctor has realised only too well that the social and economic conditions imposed by the *laissez faire* system of the past have often rendered him powerless both to prevent disease and to promote health.

A hundred years ago it was realised by a few leading physicians that the prevention of disease required social as well as medical action, and our great pioneers in the public health field accepted this view and acted upon it. Unfortunately, however, in this country the rapid growth of Public Health Services has tended to separate them from the rest of medicine and there has not in the past been a close enough liaison between clinical medicine and public health. There has been a tendency for the doctor in hospital to become more and more interested in his laboratory, leaving the public health doctor to study and deal with those social conditions which have often played such an important part in producing the very disease which brings the patient into hospital. This separation has had an unfortunate effect on both branches of medicine, and it is to be hoped that the foundation of Chairs of Social Medicine in this country will bring about an improvement by directing attention to the effect of environment, not only on the development of disease, but also on the promotion of health, though it must always be borne in mind that economics and education in large measure determine the environment and health of the community.

The environment of the individual may be conveniently considered under two parts—Home and Work. There can be little doubt that the more important of these is the home—housing, feeding and family life play a great part, not only in preventing disease but in promoting that fullness of life which is health. These in their turn depend largely on wages and on education. On the other hand, the occupational environment may in some cases outweigh the home in importance ; there

are many cases where physical and psychological factors at work assume such proportions that they dominate the whole life of the individual. But the environment cannot be torn apart in this artificial way: it is the total environment that matters—what happens at home affects the man at his work and what happens at work affects him and his family at home. It is not enough, therefore, to confine attention to either section of the environment; each must be the concern of experts, who must keep in close contact with each other and with their colleagues in clinical medicine.

### *Legal Control of Occupational Environment*

There is no need to recall here the early industrialisation of this country and how the abuses it brought with it were slowly dealt with by legislation —the labour of women and children was controlled, hours of work were curtailed and measures for the prevention of accidents and industrial disease were introduced. Gradually the standard of factory hygiene required by law was raised by Acts of Parliament, until in 1937 the present Factories Act was passed. This Act is enforced by some 400 Factory Inspectors, and there can be little doubt that it can lead to the establishment of minimum levels of health and safety in our factories.

Legislation to provide for miners' health and safety has tended to lag behind that for factories, and the first of the Coal Mines Acts prohibiting the employment of women and girls below ground, and also that of boys below 10 years of age, was not passed until 1842. At present working conditions in coal mines are controlled by the 1911 Act, though additional regulations have done something to keep statutory requirements abreast of knowledge in this field. This industry is one of the most prolific causes of occupational accidents and disease, and there is no doubt that the decision of the National Coal Board to institute a mines medical service, as well as a department for the study of the human problems of mining, is a great step forward. Those who work in shops are given some meagre protection by the Shops Act, but there are many whose working conditions are uncontrolled by law, e.g. office workers and workers in catering establishments. It will be seen that with the passage of time much has been done to ensure reasonable working conditions, but legislation is not enough unless it is reinforced by the co-operation of both worker and employer. This co-operative attitude must be cultivated and depends in large part upon education, and here the doctor has an important part to play. The doctor in industry is a member of a health team; he is powerless without the contributions of others—architects, statisticians, engineers, dieticians, works managers and teachers must collaborate in any successful health programme; and just as the great advances in industrial hygiene in the past owe more to far-sighted laymen than to doctors, so must we look to them for the greatest practical contribution

at the present time. Trained medical personnel must guide, stimulate and advise, but ultimate action is the responsibility of industrial management.

### *The Psychological Environment*

But the physical environment is not the only, or even the most important, factor in promoting health. Attention must be equally directed to the psychological side, for on his anxieties and satisfactions will largely depend a man's happiness. With the growth in size of many of our industrial units, and with the modern changes in the methods of production, psychological factors have assumed increasing importance ; we can make the factory more comfortable, we can take the hard labour out of many jobs but, given a reasonable standard of living, a man's happiness depends largely on his satisfactions, and these are in no small part provided by his work and by the human relationships in which it involves him. Industry, therefore, has great social responsibilities to those who serve it, and unless it is ready to discharge those responsibilities it will neither remain for long an efficient economic unit, nor will it play its full part in modern society.

The machine has produced a profound change in our way of life. It is the job of management not only to organise its work, but to find a way for man to live with the machine and at the same time to retain his individuality. The industrial manager is one of the most important people in our modern society, and he can certainly be a potent force in the promotion of health—the attention now being given to management training is a welcome development, and it is hoped that considerably more attention will be paid in the future to the problem of group health in this management training.

### *Work is Necessary to Health*

Industry then has a positive contribution to make to the health of the community, for it provides work, and work is essential for all of us if we are to remain healthy. There has been far too much attention in the past paid to the ill effects of work and far too little to the good it does. Without it, and without enough of it, life for most of us becomes dull and meaningless.

Work is not only essential for the fit but also for the ' not so fit,' and the introduction of the Disabled Persons Employment Act in 1944 was a notable contribution to the treatment of many men and women with disabilities, both medical and surgical, however caused. This Act imposes an obligation on employers to employ a quota—at present 3%—of disabled persons. This act resulted from experience gained in the war that the vast majority of handicapped people can be usefully employed, and when properly placed in industry are capable of an output comparable with those not handicapped.

### *Medical Services in Industry*

So the promotion of health in industry is intimately bound up with the promotion of efficiency. In the present state of our evolution the two can no longer be divorced, nor can they well even be considered apart. This is now widely recognised and the example set some 30 years ago by a few pioneer firms, of seeking the aid of the medical sciences to help solve some of their human problems, is slowly being followed. Doctors and nurses specially trained for the work are gradually finding their way into industry. The inter-war practice of the few was adopted by an increasing number during the war, and in 1945 there were some 800 doctors and 6,000 nurses engaged in this branch of medicine. Nor has there been any contraction since ; in fact expansion has continued and now coal mines, docks and electricity undertakings have followed the lead given in the war by the Ministry of Supply and have set up their own medical services. As yet we have no national industrial medical service, and in this we lag behind both France and Belgium, but our voluntary service is growing strongly and on it there is no doubt that a wider national scheme can be planned.

Let it be clearly understood that this service has special functions. It is not created to provide an overlapping personal health service, but to care for the physical and mental wellbeing of the worker in relation to his work. The doctor and nurse in industry have numerous duties which may be roughly divided into three groups :—

(*a*) To see that the worker is fit for the job.
(*b*) To see that the job is fit for the worker.
(*c*) Education.

#### *To See that the Worker is Fit for the Job*

This group includes such duties as the allocation of individuals to suitable work, and ideally should include a preplacement examination, not to skim the cream from the labour market, but to place in suitable work those who need special consideration.

The supervision of juveniles and of the older workers, the resettlement of those who have been away as a result of accident or serious illness and the provision of an efficient casualty service are all important duties which serve the individual by preventing breakdown or incapacitating illness, and serve industry by improving morale and making the best use of the labour available.

#### *To See that the Job is Fit for the Worker*

Under this heading working conditions are considered. Heating and ventilation, lighting and noise, posture and weight lifting, are the con-

cern of the works staff, but the standards set are the result of the work of the physiologist, while hours of work, shift systems and rest breaks have been the subject of study by psychologists.

This is a chemical age and new substances are daily being introduced into industry. The effects of these upon workers must be anticipated. It is no use waiting until trouble has occurred before taking action ; the industrial worker is no longer to be regarded as the human guinea pig, risks must be known and adequate engineering precautions taken to prevent trouble. Dermatitis, dust disease of the lungs, occupational cancer, can be prevented and are being prevented by intelligent managements, but are equally being neglected by others because they do not even know of the existence of danger. The new health problems of atomic energy are considerable and the assistance of physicists in this particular field is essential.

*Education*

Contact with large numbers of people gives great opportunity for health education, but the task must be approached with the greatest skill and tact —any suggestion of health preaching will be doomed to failure. It must also be remembered that management may be in as much need of this education as work-people and that because of the influence those in authority exert, it may be especially productive.

**Teaching and Research**

The nature of medical work in industry is different from that which the doctor and nurse usually undertakes, and in consequence special training is essential if waste of time is to be prevented and mistakes are to be avoided. Such training for both doctors and nurses is now available in this country and it is hoped that it will steadily raise the level of the medical work done in industry. New problems are arising daily and many of these are so complex as to need the attention of a full research team. The great contribution to knowledge in this field which has been made over the last 30 years by the Industrial Health Research Board, has achieved world wide recognition. The University Departments of Occupational Health which have been set up are newcomers to this field—these departments, situated as they are in densely industrialised areas, and attached to large medical schools, will doubtless add their contribution to the solution of many of the health problems of industry. It remains for others to see that this knowledge is applied as widely as possible. This application is the responsibility of all those working in industry—manager and trade unionist, doctor and shop steward, nurse and worker, all have their part to play—for unless its results are applied, research gets us nowhere.

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# PSYCHOLOGICAL PROBLEMS OF SEX AND MARRIAGE

By R. W. Pickford, M.A., Ph.D. (Camb.), D.Litt. (Glasgow), *Lecturer in Psychology, University of Glasgow.*

Most of the well-known contributions to the study of human sex problems for the enlightened man or woman who is not a specialist have tended to be physiological, biological or moral in emphasis. There is scope for a contribution which is mainly psychological in character, though of necessity short and therefore limited in many ways which cannot be remedied without writing a book about the subject. Psychology has probably a bigger contribution to make to the solution of these problems than many people suppose, but it is essential that a writer on such a subject should not appear as if dogmatic, therefore it is as well to mention at the start certain shortcomings of a very brief psychological study of sex. They are two: first the inability to meet fairly in so short a space all the many forms of hesitation, doubt and even resistance, often reasonable, sometimes prejudiced, which may be excited in many people's minds by a psychological analysis; second, the inability to deal adequately with the great variety and complexity of the problems at issue, and to make their reality evident without a liberal use of concrete examples.

Marriage is the acceptance by the public of the fact that two people love each other and want to live together in order to make love in the protection of reasonable privacy, to have children and to care for them and for each other. This puts the matter in its most generalised terms, though modifications might be required to meet special circumstances. Although the legal aspects are secondary issues, they are none the less important, and the institution of marriage is essential to human happiness, since it exists for the security of lovers and children. When it is beyond doubt that a marriage has gone wrong, then the barriers to freedom set up by the formalities of law should be released with liberal insight.

## *Psychology and the Biology of Sex*

It is not possible to disentangle psychology completely from biology in general, and from physiology in particular. These three sciences are inextricably entangled. While physiology concerns itself with workings of the body, generally in structural and physico-chemical terms, biology in general considers the whole organism and its living relations with the environment and with other creatures both friendly and inimical. Psychology is the science of experience and behaviour. It differs

from moral philosophy because it is an empirical, experimental and observational science, and from sociology because it is largely connected with the motivations of behaviour and with what goes on in the mind, conscious and unconscious.

The biology and physiology of sex are concerned with reproduction and all the bodily functions related to it, with the significance of sexual reproduction in heredity and evolution, and with the family as the safeguard for the young. All these very complex matters bear on the psychology of this subject, which is largely concerned with the individual's attitude to the necessities created by the biology and physiology of sex, with the analysis of motives and the manner in which they operate, their variability, their origin, stages of maturation and their abnormalities. In addition it is concerned in a purely scientific way with social attitudes, and with the complex reciprocal interaction between individual and group which is at the root of tradition and its many changes and conservative reactions. Unfortunately, psychology is a subject which is often exploited by the charlatan, and it is one upon which everybody tends to think (and with some justification) that his opinion is valuable, however little he has studied it, and upon which he is often too ready to pass judgment even when not a professional psychologist.

### *Mateships in the Animal World*

A study of the sex habits and mateships of animals leaves no room for expectation that man would become promiscuous if left in a state untrained by moralists, or for the view that our sexual regulations are the only bulwarks against licentiousness and general immorality. Even if the near relatives of man in the animal world had been promiscuous, the study of human practices by the anthropologist would not support the view that primitive man was generally unrestrained in sexual matters. In the animal kingdom, where individual mateships occur, as in the vast majority of species, promiscuity is distinguished by its rarity, while seasonal and permanent mateships are common, though often polygamous ; but monogamous mateships are by no means rare. Some anthropologists have supposed that primitive man was highly promiscuous, and it might seem that group marriage was a first step forward, to be followed by polygamy and monogamy in turn. No doubt there has been an evolution of marriage habits towards monogamy, but the slender and often fanciful evidence of early promiscuity being any greater than it is today has been very effectively disputed, and most students of anthropology now think fantastic the picture which shows the life of early man as being unregulated at the start. In addition, as the communists have found, it is as hard to force people into promiscuity as it is to force them to give up private property and possessions.

In view of the experience of a multitude of people that in the vast majority of cases love is highly particular and extremely tying, and that it does not develop by the narrowing down of a generalised interest in all members of the opposite sex towards one in particular, all this evidence against the theory of natural promiscuity may seem redundant. It is a reassurance, however, against the fears which many people have that the increasing freedom of sexual morals to-day might be a form of regression into degenerate and licentious habits natural to unguided mankind. This idea is as improbable as the prevalent view that people are born immoral and must be punished until they learn morality. It is not in the least likely that modern freedom is the beginning of a moral decline ; and, although certain groups of communists have made much of the cultivation of extreme sexual freedom, it is most unlikely that this will ever win a wide popularity. As often pointed out, it is true that there are now vastly more divorces than there were a few centuries ago, but, had divorce been as easy then, the proportion might have been greater than now, and this would have been an advantage to those concerned. It is probably better for parents and children that unhappy marriages should be terminated unless marriage guidance could bring about a satisfactory readjustment.

### *The Complication of Human Sex Problems*

Human sexual life is highly complex in ways that the physiologist and biologist can hardly realise. Their bent and training do not lead them to grasp the great variability of human sexual impulses, either in their relative strength and modes of expression, in the variety of objects and substitute objects to which they can be directed, or in the many inhibitions, frustrations, and reinforcements to which they are liable. Parallels with the animal kingdom are important but are only the beginning of the subject. Most people realise that the sexual instinct provides a powerful driving force in human life, but they are inclined to over-estimate it in one way, to under-estimate it in another, and to fail altogether to grasp its complexity in everyday life. Their over-estimate lies in the fear that other people will drift into immorality if not restrained. This is generally a projection of their own fears of what they themselves might do, and such fears are almost always groundless, though the risk of the consequences of immorality is a real one. It is an unfortunate fact of human psychology that groundless fears should often provide motivation for interfering in other people's affairs. The under-estimate lies in the common failure to admit that sex is the major human drive, need or appetite, food-seeking and aggression being the runners-up, and this failure is an expression of the forces acting against the expression of the sex instinct to be mentioned in the next paragraph. The complexity of human sexual motives and

activities can be clearly understood best by those who have made a special concrete study of these matters, and then it becomes evident that sexual impulses are normal ingredients of every interest and that they have a protean variability by which they can adapt themselves to life situations of every kind and are ever-present factors in them. There is, of course, nothing inherently either good or bad about this. It is simply a fact, just like the fact that one uses one's thumb in a vast variety of activities. Whether it is good or bad does not depend on the fact that the thumb is used, but on the kind of use that is made of it.

### *Repression and Sublimation*

The chief among the processes which lead to the complexity of human sexual impulses are repression and sublimation, both of which are necessary to human happiness and achievement. Of these, repression must be regarded as a relatively more primitive and sublimation as a relatively less primitive form of adaptation of impulses, originally intense and uncompromising, to a reality which often restricts and limits their expression. After a series of thrusts in early infancy, each of which is doomed to a kind of defeat, the infantile sexual impulses tend to reach the more overtly sexual or phallic form at about the age of three to five years. Among the higher apes this stage would lead directly forward to the adolescent and adult stages of development. In man the overt expression of mature sexual impulses is met with even more vigorous efforts at repression than its earlier and more infantile forms, and the so-called latent period sets in. This is a period in which sexual development is in abeyance, to be revived at puberty. In the intervening years intelligence matures rapidly, and the social and objective interests of the individual's life are laid down. The abeyance of sexual development in the latent period, which is peculiar to man, is the most obvious manifestation of repression. Sublimation is seen in the expansion of objective interests and in the developments by which the character and personality of the adolescent and adult are established. It is quite a mistake to think of repression as being due to outside pressure or voluntary effort. On the contrary, it is an involuntary mode of adaptation of internal origin. Sublimation distributes the energy of sexual and aggressive instincts over a variety of objects and interests, and softens their intensity in the process. As a mode of adaptation, repression is liable to fail by being irregularly distributed, sometimes too strong and sometimes too weak, and by being unrelated to the needs of the ego for self-expression, so that it produces a lack of balance and denudes the individual of important gratifications and capacities essential to life. If sublimation fails as a mode of adaptation, it generally does so by producing too idealistic an outlook, but in some measure sublimation and repression are both essential to mental happiness.

### *The Need for Sexual Love*

In the majority of individuals repression is sufficient to be an adequate safeguard against instinctive impulses and emotions of an infantile crudity, but not so strong as to compel resistance against all direct sensuous gratifications. Similarly, sublimations are normally sufficient to give rise to the variety and good quality of normal adult interests, but not so complete as to make all physical pleasure-seeking intolerable. The individual will then retain a normal desire for sexual love, and will neither resist and despise it nor be subject to intolerable cravings for gratification to an extent which cannot endure temporary denial.

It is most unfortunate that sexual love-making has never been elevated to a fine art in our civilisation. To trace the causes of this failure in terms of social psychology would be an interesting but difficult task, well worth serious study, and it is certainly due in some way to the interaction between religious standards, sometimes idealistic and sometimes puritanical, and the presence of tendencies towards excessive repression and the exaggeration of guilt and anxiety about sex. At this point it should be stated that the mere removal of repressions in general is not an aim of psychotherapy : its most general aim is to readjust repressions and to harmonise them. To the psychologist it seems more likely that the anxiety and guilt, and the numerous forms of resistance which operate in preventing the attainment of the greatest possible physical and spiritual pleasure in sexual love are due to the inharmonious workings of repressive impulses more than to lack of knowledge of sexual physiology or the lack of training in the technique of intercourse. Nevertheless, a study of physiology reduces fear of the body, and a greater cultivation by the enlightened public of the value of sexual love and its technique, would help to counteract inharmonious repressions and exaggerated sublimations.

Fortunately these ideas are becoming more widely understood to-day, and books are published in which some trouble has been taken to explain sexual love and its technique. It is becoming more widely known that the commonest ways in which guilt and resistance, even unconscious, express themselves are, on the man's part, in over-hasty and aggressively ' masculine ' activity, and in failure to awaken a response in the female organs with appropriate delicacy by suitable ' love play ' or to recognise the right moments for intromission and ejaculation. On the woman's part unconscious guilt, fear and resistance express themselves perhaps most often in an apparently commendable passivity, coldness or reserve which prevents her from inviting her partner by the right kind of encouragement to arouse in her the necessary sexual emotion. Hence many women are erroneously supposed to be frigid. It is most unfortunate that a sexually unco-operative attitude in women should by convention have become acceptable in the view of many men. The result of these varied forms of

resistance is that the sexual act is over before either partner has discovered what it had, at least potentially, in store. This account does not exhaust the complications with which the practical psychologist has to deal in his efforts to help, but merely mentions those which are among the most obvious. It is beyond doubt that assiduous cultivation of sexual love is the most effective safeguard for married happiness. In case any reader might be inclined to reply that sexual indulgence is weakening and immoral, it must be said that, on the contrary, sexual love brings a deep satisfaction that is both refreshing and invigorating.

The question of extra-marital intercourse is a complex and difficult one, and unfortunately cannot be handled adequately in an article so short as this. It does appear, however, that so far as the majority of people is concerned, the choice does not lie, as is ordinarily assumed, between premarital intercourse and complete chastity, but between adequate love-making by the un-married and 'petting' in the American sense or masturbation, which are such feeble and unsatisfactory, though popular substitutes.

It is altogether unsatisfactory to suggest that we should make love only when it is reasonable to want children. Some spiders and other animals may be made that way, but emphatically mankind is not. A simple calculation will show that, on a low estimate, an ordinary man and woman will want to make love several hundred times for every time they will want, or can be expected on reasonable grounds to want, a child. It is therefore clear that efficient contraceptives are ordinary domestic necessities. If it could be shown that anything was gained by abstention, then serious evidence would be deserving of study, but psychologists have found that the so-called moral advantages of sexual abstention are almost invariably bought at the risk of happiness both to parents and, indirectly, to children. While there may be something to be said in favour of abstention by the unmarried, there is nothing in its favour by the married, outside exceptional circumstances, and the efforts to maintain abstention usually end in irritation, depression, anxiety, inefficiency at work and a sense of privation, none of which has any moral value whatever.

Many difficulties are being passed over for lack of space to discuss them, but probably that of venereal diseases cannot be omitted altogether. Some readers will object that those who have sexual relations freely may run increased risks of catching venereal diseases, or at least they may say that the possibility of spreading these diseases might be increased in that way. This article, however, does not recommend promiscuous sexual relations, but assumes that sexual partners are married, and that they love each other, when the tendency to change the partner frequently is greatly reduced. Under these conditions there are no risks of venereal diseases becoming more widespread. The most essential mechanism for the bio-

logical distribution of these diseases is the very frequent exchange of sexual partners. In any case, it is no more sensible to prohibit sexual love for fear of syphilis, than to prohibit travel in Africa for fear of lions, and the use of the phobia of venereal diseases to support ' moral ' frustrations is simply a rationalised form of unconscious resistance against sex.

### *Marriage Guidance*

The subject of marriage guidance is one which is gaining increased and deserved attention. Divorce is not, in the majority of cases, the best ' remedy ' for marriages that have failed in some way. Those who have one unhappy marriage are, unless they gain effective outside help, only too prone to make another, and often the help which would prevent a second failure would put the first marriage right if given in time. Certainly increased ease of divorce is a great social advantage and it is reasonable that if marriage is easy, divorce should be equally or almost equally easy. It is, however, difficult for a practical psychologist to understand how the procedure of a public court can possibly be an advantageous way to approach and understand the subtle and intimate complexities of marriages which have broken down. It is very difficult to understand how the question whether a couple ought to be divorced should be made to rest on technicalities and evidence about unfaithfulness, cruelty, desertion and the like which are, in most cases, simply the bi-products of the fundamental difficulties of the unfortunate couple. The question of divorce should rest on the hopes of a solution of those fundamental difficulties. In a vast number of cases a solution can be found, especially if they are taken in time, and for such cases divorce should never be considered.

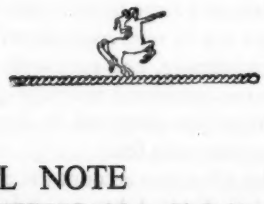
Among normal people of simple and ordinary tastes, and who do not have highly specialised and cultural interests, often it is necessary to establish the art of sexual love in addition to romance in order to ensure married happiness. For those whose conflicts in marriage seem to centre about highly specialised tastes and interests there are deeper forms of psychotherapy available, and there is a large field for this kind of work. It is our experience that marriages can be repaired even when the difficulties seem at first sight to be overwhelming, and no couple should seek divorce or separation before they have considered marriage guidance, however complex their problem. With this safeguard, it should be possible to have divorce simply for the payment of a fee.

Marriage guidance also takes into account the question of helping those who intend marriage. It is directed then towards assisting them in realising the kind of obligations to each other which they are incurring, and adjusting beforehand conscious and unconscious fears and any sense of guilt that may interfere with happiness later. Thus psychological insight and physiological knowledge may be gained which is an advantage in pre-

serving their love relationship after marriage ; and as many people know this is sometimes difficult. In this way many marriages can be safeguarded against possible breakdown, and a few, in which breakdown would be inevitable, can be prevented from taking place. In general, psychological insight and practical experience of psycho-therapy are relatively more important in marriage guidance than is medical knowledge. It is surprising how many apparently serious physical handicaps can be overcome where there is adequate psychological insight. It is probable that the greatest hopes for the success of marriage guidance will be at the stage when difficulties are becoming apparent and before an open breakdown is reached.

### *Conclusion*

While some of the most difficult problems of psychology have been passed over in this article, it has served to bring forward several ideas which are of considerable importance to the enlightened public. Morality is an ingredient of the normal man's outlook, and there is little danger of its widespread breakdown. At least nobody need fear seriously that the modern changes in the cultural pattern of sex and marriage are leading in that direction. Psychology has an important contribution to make to everyday human problems, among which are those of sex and marriage. Lack of realisation of the importance of the art of sexual love is one of the greatest failings among Western peoples, and this must be understood as an expression of unnecessary guilt, of inharmonious repressions and exaggerated sublimations. In marriage guidance psychologists can make a major contribution to the advancement of human happiness and achievements. It would be a pity, however, if enthusiasm for psychological analysis should lead anybody to underestimate the romantic side of love and marriage.



## BIOGRAPHICAL NOTE

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# MILESTONES IN MEDICINE
## 3. PUBLIC HYGIENE IN THE ROMAN WORLD

By E. Ashworth Underwood, M.A., B.Sc., M.D., D.P.H., F.L.S., *Director of the Wellcome Historical Medical Museum; Hon. Lecturer, University of London.*

" Captive Greece led captive her proud conquerer " is a tag peculiarly apt in the medical field. At an early period there was an infiltration of Greek physicians into Roman life, and hence there are with the exception of Celsus few native Roman medical writers. Yet Rome contributed materially to the science of health. From early times there was an active interest in public sanitation, and for ten centuries official measures sought to give a healthy mind in a healthy body.

Official hygiene in Roman times included the following branches; sewerage, the draining of marshes, supervision of housing, burial regulations, supervision of food supplies, emphasis on bathing, and—most important of all—the provision of highly adequate water supplies.

Ancient Rome was honeycombed by a network of drains, and as early as 494 B.C. Aediles were appointed. Part of their duty was to supervise the cleansing of the streets and the maintenance of the sewerage system. The Cloaca Maxima, the great sewer from the Forum to the Tiber, was constructed in the fifth century B.C. Strabo, writing about the beginning of the Christian era, describes the great sewers " along which a hay-cart might be driven." Many of these still exist. The City authorities also drained the malaria-producing swamps which were so common. Solid refuse was collected in carts and taken outside the city for agricultural purposes.

The Romans supervised very carefully all building work in the City. The typical Roman villa, which is often described in works of fiction dealing with the Roman world, was really confined to the upper classes. The working classes lived—at least during the Empire—in tenement houses of three or four storeys, the ground floor being occupied by shops. The non-medical writers, Vitruvius and Varro, both emphasised the importance of site and sanitation.

Burial of the dead was prohibited inside the City. For the poorer people there was a cemetery outside the City, and the rich were usually buried in elaborate tombs along the main roads. Later cremation became popular, but with the rise of Christianity a reversion took place to earth burial.

Markets and their foodstuffs were supervised by the Aediles, who could punish vendors of unsound food. They also supervised weights and measures, and to some extent prices.

The bathing establishments which reached such a magnificent standard during the Empire are well known. As centuries passed bathing developed into a social custom of the rich. These establishments would have been impossible without the water supply of ancient Rome. The first aqueduct was built about 300 B.C., and by the time of the Caesars there were fourteen great aqueducts, which supplied each person with over a hundred gallons of water daily. From the storage cisterns the water was taken to the houses by lead pipes. The provision of a magnificent water supply must be considered as Rome's greatest contribution to health.

## REGIONAL COURSES

The Central Council for Health Education believes that in the long run the most valuable health education work is done by professional workers in the course of their day to day duties, and for some time, therefore, it has arranged courses on health education for various professional and occupational groups.

As part of its services to local authorities it is now planning to provide for such groups, post graduate two-day courses on the content, principles and methods of health education. Separate courses for teachers, public health nurses and sanitary inspectors will therefore be held during the coming autumn and winter in the university towns of Belfast, Birmingham, Bristol, Cambridge, Cardiff, Exeter, Hull, Leeds, Liverpool, London, Manchester, Newcastle, Oxford, Nottingham, Sheffield and Southampton. It is also hoped to arrange courses on food and drink infections for school meals organisers, canteen supervisors, etc. in the same centres.

The courses will be open to all the local authorities in each region and will be provided entirely free of charge.

Full details, and an invitation to nominate suitable students, will shortly be sent to the Medical Officers of Health and Chief Education Officers in the areas concerned.

A great Roman aqueduct, The Aqua Claudia, built by Hadrian in A.D. 38.

A group of piccaninnies at a nursery school in Durban await immunisation against diphtheria.
*(By permission of The Medical Officer of Health, Durban, S. Africa)*

Hlth. Educ. J., 1948, 6, 113—116

# PREVENTION OF DEATH AND DISEASE IN CHILDREN

By R. S. Illingworth, M.D.(Leeds), F.R.C.P., D.P.H., D.C.H., *Professor of Child Health, University of Sheffield.*

If the infant mortality in England and Wales was the same as that of New Zealand, 18,000 fewer babies would die every year in the first year of life. It is true, of course, that much of the morbidity and mortality of infants and children is not yet preventable. We cannot as yet avoid the effect of genetic factors, we cannot entirely prevent premature delivery, we cannot prevent rubella in pregnancy, and a whole variety of obstetrical complications which increase the risk to the foetus ; we cannot cure virus infections in man, and can do little to prevent them ; we cannot cure leukaemias and malignant disease. But a great deal can be done to reduce infant and child mortality and morbidity, as indicated by the following figures for the infant mortality in England and Wales compared with those for other countries.

| | |
|---|---|
| England and Wales, 1946 ... ... | 43 |
| Sweden, 1946 ... ... ... | 30 |
| Australia, 1945 ... ... ... | 29.4 |
| Iceland, 1943 ... ... ... | 28 |
| Chicago, 1946 ... ... ... | 28 |
| New York, 1946 ... ... ... | 28 |
| New Zealand, 1946 ... ... ... | 25.43 |

The neonatal mortality in England and Wales in 1938 was 26, while in Chicago in 1940 it was 18, and in Amsterdam in 1937 it was 16.

### What Can be Done?

*Specialised training for doctors and nurses.*—There must be better training of general practitioners, paediatricians, obstetricians, school medical officers, maternity and child welfare doctors, nurses, midwives and health visitors. The pregnant woman should not be in the hands of the practitioner, but in the hands of one specially trained in obstetrics. The newborn baby should be looked after by the paediatrician, and not by the obstetrician. Child welfare doctors and school medical officers should have first class training in paediatrics before they take up their speciality. Good refresher courses should be constantly available for practitioners, school and child welfare doctors. They should not consist of demonstrations of rare cases, or of learned discussions of complex investigations and special lines of treatment which can only be carried

out in hospital, but of methods of diagnosis and treatment which are essential in the home, school and clinic.

The paediatrician, child welfare doctor, practitioner, midwives and health visitors should have special instruction in the maintenance of breast feeding, and in the prevention of infection in the newborn.

*Breast feeding.*—The art of breast feeding is neglected by the great majority of doctors and nurses, and yet we know that the infant mortality and morbidity is very much higher in the artificially fed than in the breast fed, and that severe gastroenteritis is practically unknown in fully breast fed infants. We know that most women *can* breast feed their infants: they do in India and Japan and other countries, where there is much greater poverty than in this country, but where there is the knowledge that because of the lack of other foods the baby will die if it is not breast fed. Harold Waller in South London is able to report that 80 per cent of 300 consecutive mothers under his supervision were fully breast feeding their infants at six months of age. In Sheffield only 36 per cent of 120 consecutive normal infants brought up to the Well Baby Clinic in the Children's Hospital were breast fed at the age of two months. The mothers had stopped breast feeding for a whole variety of reasons, which in the vast majority of cases were totally inadequate. In the majority lactation had failed in the first fortnight, when the mother first got up. This failure was due in most cases to improper instruction by doctors and nurses, who failed to realise that this falling off of milk production is purely a temporary affair if only the mother can be tided over the first few days, every effort being made to keep the baby on the breast, to avoid complementary feeds except where absolutely necessary, even if there is slight loss of weight, and to make sure that both breasts are fully emptied at each feed. Many babies were taken off because it was said that the breast milk was not suiting them—a phenomenon which in fact never occurs. Many of these babies had diarrhoea, which was due to the fact that the mothers were being wrongly given senna, aloes, rhubarb and cascara, all of which affect the baby through the milk. Many others were taken off on account of a cracked nipple, whereas the correct treatment is to take the child off for a day or two only to permit of healing of the nipple with penicillin cream, care being taken in the meantime to empty both breasts fully by manual expression, giving the expressed milk to the baby. One sees so many tragedies, so many unnecessary deaths from gastroenteritis, often in the only child, or the child of an elderly primipara, who has been put on to the bottle because of the ignorance of the nurse or doctor of the art of breast feeding, whereas with proper care the baby could have been fully breast fed and so avoided the gastroenteritis.

*Hospital hygiene and accommodation.*—As for the prevention of infec-

tion in the newborn in British hospitals, the level of hygiene in most hospitals is very low by American standards. In the writer's experience few hospitals indeed maintain the high standards laid down in the Department of Health for Scotland's report on Neonatal Deaths due to Infection. Yet these high standards are necessary. In England and Wales approximately 14,000 infants die each year of infection in the first year of their life. One report showed that 73.6 per cent of deaths in infants aged 8–28 days were due to infection. Communal nurseries for the newborn are a great danger. The newborn baby should never be removed from its mother for any purpose—for sleeping, napkin changing or weighing, and all newborn nurseries for well babies should be abolished.

Better hospital accommodation should be made available for infants and children. The standard of British hospital accommodation for children is lamentable. A large number of separate cubicles is essential for the care of babies and small children. A further great need is the provision of many more convalescent homes.

*The premature baby.*—There should be a domestic premature service in all cities, in order that premature babies can be treated at home with expert paediatric and nursing care.

*Overcrowding.*—The present gross overcrowding in British cities should be dealt with as a matter of great urgency.

*Illegitimacy.*—Education of mothers by films and other methods may help to reduce the incidence of illegitimacy, which is responsible for much infant mortality and much mental suffering in later childhood.

*Immunisation.*—Even greater effort should be made to immunise children against diphtheria, and to maintain the immunity. It is probable that immunisation against whooping-cough by potent vaccine will be found to be just as valuable in England as it has proved to be in America and Canada.

*Tuberculosis.*—Sufferers from open tuberculosis *must* be kept away from children. The present state of affairs is appalling. Thousands of cases of open tuberculosis are allowed to stay at home, with the result that thousands of children become quite unnecessarily infected by tuberculosis.

*Pasteurisation.*—All milk should be pasteurised. There is no excuse for the large number of cases of bovine tuberculosis which still occur in this country. This infection has been almost eliminated in the U.S.A., Sweden and other countries.

*Special schools.*—There should be much more accommodation in special schools—open air schools, schools for cases of active rheumatic diseases, and handicapped children, including those with cerebral palsy. These children should be under much closer supervision by the specialist —the paediatrician, orthopaedic specialist and others. Far too many

children suffer needless restriction of exercise, particularly on account of heart disease. No child with inactive rheumatic heart disease, and no child with acyanotic congenital heart disease, should be in a school for physically handicapped children, because he should take a normal amount of exercise. Too many doctors restrict exercise because of some anatomical diagnosis, because of some murmur which has unfortunately been found, the while paying no attention to the only thing which matters —the functional capacity of the heart, the amount of exercise possible without undue dyspnoea on exertion.

*Mental health.*—The mental health of the child can be improved by the education of parents, by the tightening up of adoption laws, by the most rigid supervision of all institutions for homeless children, and by provision of many more residential schools for children who have got out of control at home, or who are in a bad domestic environment.

*School meals.*—The provision of school meals should be greatly increased, by provision of more kitchen accommodation, and the like.

### A challenge

A very great deal can be done on the above lines. A great deal has been done on most of these lines in other countries. In many of the above matters, such as the prevention of infection, the prevention of tuberculosis, and hospital accommodation, we lag far behind other progressive countries such as Scandinavia, Australia, New Zealand, Canada and the U.S.A., and the result is well reflected in their much lower infant mortality. We have a long way to go, and we have no grounds for complacency and self-satisfaction. Many difficulties will have to be overcome in translating many of the matters mentioned into accomplished fact, but none of the difficulties are insuperable, and the results would reap rich dividends in a lowered infant mortality, and better physical and mental health in childhood.

## BIOGRAPHICAL NOTES

PROFESSOR R. S. ILLINGWORTH, F.R.C.P., D.P.H., D.C.H.—Professor of Child Health, University of Sheffield. Is a graduate of Leeds University. During the war he was a Lt.-Colonel in the R.A.M.C. He held a Rockefeller Travelling Fellowship in the United States, and was first assistant to The Professor of Child Health, London University (Professor Alan Moncrieff) prior to taking up his duties in Sheffield.

PROFESSOR RONALD E. LANE, F.R.C.P.—Was appointed to the Chair of Occupational Health in Manchester University in 1945—the first appointment of its kind in this country. He has been associated with industrial medicine for the last 20 years, and his name is associated with elimination of lead poisoning in the electric storage battery industry. He is an Honorary Physician at Salford Royal Hospital and a member of the Industrial Health Research Board and other Government Committees dealing with the health of the worker.

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# NEW CONCEPTS IN DENTAL HEALTH EDUCATION

By Allen O. Gruebbel, D.D.S., M.P.H., *Executive Secretary, Council on Dental Health, American Dental Association, Chicago, Illinois.*

The control of oral diseases and the restoration of masticatory function have become essential parts of personal hygiene and public health practice. In the United States of America, the public's appreciation of a healthy mouth is growing steadily—in all probability, as a result of the dental health education activities of recent years.

From a public point of view, dental diseases and anomalies present a formidable problem because of their extremely high prevalence and because, heretofore, almost no effective preventive or control measures have been available to reduce the size of the problem in large groups of people.

Although an academic classification of " dental diseases and anomalies " would take up several pages of printed text, it will suffice here to say that conditions which create the dental public health problem are (1) diseases of the teeth, mainly dental caries ; (2) diseases of the supporting tissues of the teeth (pyorrhea and Vincent's disease) and (3) malocclusion (irregular teeth). With one exception, mottled enamel, none of the dental diseases or anomalies is as yet completely preventable in the same sense that many of the communicable and nutritional deficiency diseases are preventable.

At present, oral disease control, like cancer control, consists mainly of early detection and treatment. Both of these procedures require continuing co-operation on the part of the public and highly skilled operations by trained professional personnel. But it is unlikely that early detection and treatment will alone effectively control either cancer or diseases of the teeth and their supporting structures. The solution of these health problems will be found in prevention, eventually. In the meanwhile, however, all available resources should be used to improve diagnostic and treatment methods and, equally important, to motivate the public to practice the rules of healthful living that are in keeping with modern scientific knowledge.

Recent studies have shown that many time-honoured concepts of the causes and cures of oral diseases were only poor guesses after all. It is now well known, for example, that the consumption of milk, vegetables and fruits, while desirable from a general nutritional standpoint, will not

prevent dental caries. The public, however, is finding it somewhat difficult to believe that tooth decay is not directly related to an inadequate diet. Of course, health education will correct this mistaken idea as it has many others, but in this case health educators and the health professions have perpetuated an ' old wives' tale ' for so long that they themselves find it somewhat difficult to accept the new concept of the cause of tooth decay.

### *Cause of Dental Caries*

Although all the dental diseases and anomalies are being studied by dental research workers, dental caries has received the greatest amount of attention, probably because caries is the main cause for the loss of teeth.

Dental scientists in general agree that dental caries is caused by acids resulting from the action of micro-organisms on carbohydrates. The acids involved in the caries process are derived from carbohydrate substances after they have been acted upon by microbial enzymes. The enzymes have their origin in the microbial flora which has an enzyme system capable of breaking down carbohydrates to acids. Any micro-organism or combination of micro-organisms capable of maintaining an acid potential sufficient to decalcify enamel is capable of initiating tooth decay.

For many years it was presumed that teeth decayed because they were soft or defective as a result of an inadequate diet. A number of investigators suggested that an inadequate consumption of calcium, phosphorus and vitamin D caused teeth to be easy prey to tooth decay. This opinion resulted in a great deal of propaganda favouring more adequate diets and calcium supplements for children as a caries preventive measure. Dentists soon learned though, that children who received optimum amounts of calcium, phosphorus and vitamin D continued to show the same susceptibility to dental caries. Scepticism over the importance of nutrition in caries control has been heightened as a result of reports of a *decrease* in dental caries rates in Dutch and Italian children during the last war when the nutritional standards were reduced drastically. Both reports concluded that the reduction in caries incidence probably was due to the greatly reduced consumption of sugar.

Although it has been clearly demonstrated that vitamin D is of value in the formation of hard dental structures including the teeth themselves, the inference that this vitamin aids in the prevention or retardation of dental caries is not supported by scientific findings. Indeed there is considerable evidence that the enamel of sound teeth and the sound enamel of carious teeth show no difference in composition with regard to calcium, phosphorus, magnesium and carbonates. Apparently human teeth will not become more susceptible to decay even when the individual is subjected to severe nutritional deficiency. Day, in a study of the incidence of dental caries in children born of women with severe osteomalacia in

Northern India, reported that only two of 144 teeth in seven children with severe rickets were carious.

### *Control of Dental Caries*

Obviously, then, we have no reason to believe that the control of dental caries can be accomplished by fortified diets or other nutritional methods. On the other hand, it has been demonstrated that caries can be prevented by prescribing low carbohydrate diets when saliva tests show a high degree of caries susceptibility. Although this procedure is scientifically sound, its success depends in a large measure on unremitting effort on the part of the dentist and health educator in securing continued co-operation of the patient in eliminating or reducing the intake of sugar, natural as well as refined. Unfortunately in the United States it has proved difficult, if not impossible, to obtain the support of caries-susceptible individuals in eliminating sweets from the diet, since many of them seem to want sugar more than they want caries-free teeth.

Preliminary studies have shown promise that a number of other techniques will also prevent caries. Chewing gum containing synthetic vitamin K, mouthwashes and dentifrices containing dibasic ammonium phosphate and urea, and penicillin have given favourable results in laboratory experiments. Thus far, however, the investigations have not provided sufficient evidence to justify their use in dental or public health practice.

The therapeutic use of fluorides offers the greatest hope at the moment as a relatively simple method for preventing a large portion of tooth decay, especially in children. Sodium fluoride is being added to the public water supplies in ten communities in the United States in carefully controlled tests. The results of these demonstrations will not be known for another six to eight years, but the investigations which preceded the tests indicate strongly that the chances of success are very good.

The application of a 2% solution of sodium fluoride to the teeth of children is now being advocated by the dental profession. A series of studies involving several thousand children in which from one to fourteen applications of the fluoride solution were made, demonstrated beyond reasonable doubt that a reduction of approximately forty-five per cent in caries incidence can be obtained. It was also found that four applications, spaced a week apart, following a dental prophylaxis, will be as effective as any method tried thus far. The treatment cannot be applied as a home remedy, but instead, should be given by a dentist.

After carefully considering these findings the Council on Dental Health of the American Dental Association expressed the opinion that " topical fluoride therapy should be used routinely in private dental offices and in school and community dental health programmes."

The control of dental caries is only one of the public health problems in the dental field. There is every reason to believe that the other oral health problems—the control of malocclusion and diseases of the supporting structures of the teeth—will be attacked with equal vigour in the near future. These goals will be achieved when the public becomes sufficiently interested in the problem, through health education, to give the research workers and the health professions the support they need.

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*The views expressed by Dr. Gruebbel are those generally held in the United States of America. The authoritative British view-point differs in certain respects : while it is unlikely that the tooth of perfect structure will withstand decay in all circumstances, it will probably stand up better to bad conditions than will a poorly formed tooth ; and, although oral hygiene by itself may not prevent dental decay, it may make adverse circumstances less damaging.*

## BIOGRAPHICAL NOTES

ALLEN O. GRUEBBEL, D.D.S., M.P.H.—Attended the Central Missouri State Teachers College before receiving his dental training at the Kansas City University School of Dentistry. Practiced dentistry in Lexington, Missouri, for fourteen years, during which time he became interested in health problems of children. In 1937-38 attended Johns Hopkins University and received a Master's Degree in public health. Served as Director of the Division of Dental Health, Missouri State Health Department, 1938-1944. For the past four years has acted as Executive Secretary of the A.D.A. Council on Dental Health. Member of the American Dental Association, American College of Dentists and Omicron Kappa Upsilon.

PROFESSOR LAWRENCE P. GARROD, M.D., F.R.C.P.—Professor of Bacteriology in the University of London and Bacteriologist to St. Bartholomew's Hospital. His main interest for many years has been in antisepsis and chemotherapy, on which he has broadcast and lectured abroad as well as contributing many papers to medical journals. A member of the Committees of the Medical Research Council which directed the original studies of the clinical use of both pencillin and streptomycin.

F. W. HODGSON, B.Sc., M.R.I.P.H.H.—Trained at Carnegie College of Physical Education, Leeds. Before the War taught in secondary modern and grammar schools in Co. Durham and Cumberland. Served as Flight Lieutenant in the Royal Air Force. Now a Senior Lecturer in Physical Education at the City of Coventry Training College.

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# HEALTH EDUCATION IN SCHOOLS

By F. W. Hodgson, B.Sc., *Senior Lecturer in Physical Education at the City of Coventry Training College.*

In spite of all that has been done to emphasise the importance of this subject and to give it the place it deserves in our educational system it seems that there is still a big, unbridged gap between intentions and achievements. Schools still appear to suffer, consciously or unconsciously, from the carry-over of the old ideas in which the body was regarded as ' not nice ', and this difficulty is not an easy one to overcome. Contact with hundreds of teachers in training reveals a number of interesting facts which must be faced and dealt with, though the prospect of a rapid breakdown in present attitudes is not great. Many have picked up a limited number of ' first-aid hints ' but generally speaking are quite ignorant of the reasons behind these acts. Indeed the construction and working of the body are completely unfamiliar. These men have reached maturity, many of them have served in the Armed Forces and have a wealth of information on many subjects in their possession, but have never considered how it was possible for a child to stand on his toes, much less whether such a movement would be of value in correcting flatfoot. They are already aware that the success they achieve in their teaching of arithmetic and English may affect the future careers of their pupils but they receive in stunned silence the suggestion that the way a child sits in his desk during those ten vital formative years (which Nature never intended should be spent at a desk) may affect his posture and maybe his health throughout the rest of his life.

The interest which is aroused by a series of lectures is apparent very early in the course. Questions are raised, usually after lecture hours, on all manner of personal ailments and family problems, many being of a very intimate nature. Histories of relatives are quoted to illustrate points, experiences are recounted and always there is abundant evidence of a desire to know more of the subject and to contribute to the facts already known. Behind all this then, is a feeling that these students are waiting for an outlet, that here is a subject in which there has always been an interest, conscious or otherwise, which has never been given an opportunity for development. The fact that there is a tendency to accept, or at most to discuss, the spoken word rather than to refer to the text-book is an added complication, and suggests that the individual has been led to believe, so far, that this was not a subject for text-book treatment or

else it suggests that our text-books inadequately serve the purpose for which they are intended. Since excellent text-books exist, it would seem that the difficulty lies with the attitude of the individual, and it is this attitude which is so important in our consideration of the problem. It is a mirror of what has happened in the schools so far ; an indication of the thoughts and reactions of the citizens of today who were the scholars and pupils of the schools of yesterday. We must consider seriously whether we have succeeded in changing the situation in the schools, whether we are tackling the subject in the right way yet or whether our heads are still in the sand. What indications of the change do we find in the schools today?

An answer to this question is all too apparent when the student begins to enquire into the practical aspect of the matter. While still busily engaged in acquiring knowledge for himself he is confronted with the problem of how to pass on his knowledge to the children. That he should consider the two things together is a good thing, for it colours his work and supplies a professional objective. On investigating the procedure adopted in various schools, the striking fact arises that, while the subject of hygiene occurs in the timetable of some schools there are many more schools in which it does not. Here then is a controversial issue of primary importance. Is the subject to be taught in schools? There appears to be no laid-down policy in this matter, although the Central Advisory Council for Education (England) in their book *School and Life* give an indication of the trend when they state that, while agreeing with the Society of Medical Officers of Health in their recommendation that there should be specialist teachers who are qualified and responsible for the teaching of hygiene, they do not wish to see ' specialist ' treatment come to mean merely ' subject ' treatment. Anyone who has had to follow a series of weekly lessons on this subject can testify how divorced from reality such lessons can become unless handled by an inspired teacher.

### *An Integral Part*

It seems reasonable to suggest that hygiene should not be allotted thirty minutes per week but should permeate every teacher's work, each day and every day. There are no periods allocated for good manners and good behaviour, but no teacher ignores the opportunity to deal with this side of the child's upbringing. Similarly, every opportunity should be taken to make the child conscious of what is good and desirable for clean, healthy living. All too often correction and assistance is given grudgingly as an aid to teaching and discipline rather than as a positive lead on the path to health. The sprawling position is corrected because the child is not attending ; the windows are opened because the class is

sleepy ; the child is told to wait when he wants to be excused in the middle of a vital part of the lesson ; hand-washing is insisted upon before the art lesson because of the effect of grubby fingers on the drawing paper. In a consideration of true values surely the health of the schoolchild should rate higher than it does, and should not be left to a backhanded support, and incidental methods. Only by bringing health and character training to the fore and allowing academic attainment to follow on in the schools is there likely to be any real change in the nation's attitude.

This line of thought would appear to imply that there is no place for the specialist, and no place for specific subject matter in hygiene in the school. It is probably true that the weekly hygiene lesson which appears on the timetable but is seldom honoured as such, and which is taken by the only member of the staff available for that period, is strongly condemned by many educationalists today, but it is by no means true that specialist instruction in the subject is not desirable. An immense amount of valuable work can be done by the teachers of physical education and by science teachers. In the gymnasium, the changing room, and at the swimming bath, vitally necessary information about such matters as menstruation, masturbation, night losses, enuresis and so on can be dealt with quite easily and naturally, in addition to such matters as foot cleanliness, athlete's foot, skin troubles, infections and general bodily cleanliness. In the laboratory the human body can be studied just as naturally, and much more profitably than can that of the frog, the mouse and the rabbit.

Another great opportunity now presents itself in the prevailing swing from ' subject ' to ' project' in the modern school. If more originality were shown in the choice of these projects and the popular topics of coal, transport and the like were rested in favour of topics involving such things as medical services, health of the community, anatomy and physiology, along with topics of a moral nature, then the neglected physical and moral welfare of the schoolchild need not be reflected in the unbalanced citizen of tomorrow.

### *What of the Future ?*

Thus the possibilities of effecting a considerable improvement in the teaching of hygiene in schools are with us today, but whether these possibilities can be seen and seized upon by the profession as a whole is a very different matter. Unless there is a united attack the change is bound to be a slow one and, though many sparks may glow up and down the country, the conflagration which will do away with the old-fashioned and ill-considered methods of treating the subject of hygiene and lead to a nation-wide drive for positive health may be long delayed.

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# CHEMOTHERAPY

By Lawrence P. Garrod, M.D., F.R.C.P., *Professor of Bacteriology, University of London. Bacteriologist, St. Bartholomew's Hospital.*

The most obvious way of getting rid of microbic disease is by killing the microbes which cause it. The only direct means of doing this when they are in or about the body is by the use of some chemical which will poison them. This is often done—or at least attempted—by applying such a substance to a particular area, such as the skin, or a wound, where it is thought necessary to kill microbes. This process may be called disinfection or antisepsis. A much more ambitious aim is to attack the microbes from within, by means of a drug which is swallowed or injected and permeates the whole body in the blood. This is chemotherapy.

### *Requirements for a Chemotherapeutic Drug*

The conditions which must be fulfilled before any drug can qualify as a chemotherapeutic agent are far more strict than those necessary for an antiseptic. Since it is going to be distributed throughout the body, it must be greatly diluted, if only in the blood, of which a person of average size has 13 pints. It must therefore be able to act on microbes even when diluted to an extent which deprives many antiseptics of activity. A more difficult condition is that, while being lethal to microbes, it must be harmless to the body itself in every part. Generally speaking it is much easier to poison a complex creature than a simple one, because poisoning is usually an interference with function, and there is such a variety of functions in organs like the heart, liver, kidney and brain that many substances harmless to primitive things like microbes will interfere with them seriously. It is thus not surprising that the number of drugs capable of successful action of this sort is small. Nevertheless there are such things, and they are of three kinds, the discovery of which marks three separate eras in the development of chemotherapy.

### *1638-1907. The First Plant Period*

In the year 1638 the wife of the governor of Peru was cured of a fever, doubtless malaria, with an extract of cinchona bark. This is the first well-attested example of a treatment which became universally recognised as specific, long before quinine, the active principle, was extracted from the crude bark. Not quite so ancient is the use of ipecacuanha root for a form of dysentery: the active principle here is emetine. These two substances are alkaloids, and they are the only substances of this kind having such an effect.

### *1908-1939. The Synthetic Period*

During this second era chemists were busy making new chemical compounds, and testing them as cures for microbic disease, usually in animals first. Thousands of these synthetic drugs were worthless, but a few proved to be winners. The first was salvarsan, used for the treatment of syphilis, then Bayer 205 for African sleeping sickness, and—most important of all—the sulphonamides, the use of which dates from 1935. The effect of this last discovery was far-reaching, because these drugs act on a large number of ordinary bacteria—as distinct from the more complex or peculiar microbes causing malaria, syphilis and sleeping sickness. Moreover these bacteria cause not one disease but many: streptococci, for instance, cause septic infection in wounds, acute sore throat, disease of the ear, meningitis, puerperal fever, and even sometimes pneumonia. Hence a very wide range of common, serious and often fatal bacterial infections became subject to successful chemotherapy, and the whole outlook in these diseases was profoundly altered. A good idea of what this meant can be gained from the graph showing the mortality in this country from puerperal (childbed) fever before and since 1935*. The sulphonamides are entirely responsible for the reduction in mortality which this represents, except that in the last year or two it may also have been contributed to by penicillin. The mortality from pneumonia in most of its forms, from cerebrospinal fever and other forms of meningitis, and from septic infections generally, has also been reduced greatly.

### *1940-1948. The Second Plant Period*

To describe the past eight years as a third era in which a new form of chemotherapy has appeared is not to imply that the era of synthesis is past. New sulphonamides have been developed, and at least one valuable synthetic anti-malarial drug, paludrine. Nevertheless this period is chiefly notable for the introduction of an entirely new class of drug, the so-called 'antibiotics.' It is particularly interesting that these represent a reversion to the search for useful drugs in natural sources in the plant kingdom. Quinine and emetine are derived from higher plants, a tree and a shrub. Antibiotics are produced by primitive plants—moulds or even bacteria themselves. They appear to be the weapons wherewith these creatures attack other species, and so compete for space and nutriment. The best place to look for a mould or bacterium forming an antibiotic is material—such as manured soil—in which there is a varied and overcrowded microbic population, and consequently fierce competition for what the Germans used to call *lebensraum*. We have long recognised that war between species is natural in the animal kingdom: it is rather depressing and shocking to realise that a similar state of affairs exists among such apparently gentle things as plants.

* Page 126.

TOTAL DEATHS FROM PUERPERAL FEVER
IN ENGLAND AND WALES
1932–45
1000
900
800
700
600
500
400
300
200
100
1932
'33
'34
'35
'36
'37
'38
'39
1940
'41
'42
'43
'44
'45

The best known of all antibiotics is penicillin, and its story needs no re-telling. But it may be worth while, in this brief review of the whole history of one form of therapeutics, to explain why the discovery of penicillin was so immediately valuable, as well as important in opening up a new field. We now have efficient kinds of chemotherapy for perhaps a majority of microbic infections, and anything new which is to be of value must represent an advance in one of three main directions. It may in the first place attack microbes on which previous drugs have no or not enough effect. The range of activity among different species of the sulphonamides and penicillin is similar: many bacteria are susceptible to both. One notable exception is the staphylococcus, which ranks second only to the streptococcus as a cause of various kinds of septic infection: penicillin can deal with this, whereas the sulphonamides usually failed. Secondly, it may have a more powerful or rapid effect, and this penicillin certainly has in many conditions. Thirdly, it may be less toxic—that is, less liable to damage the body itself in some way. This, again, penicillin certainly is: its most remarkable property is its entire harmlessness. Enormous doses, on a scale which if applied to other drugs would be highly dangerous or even fatal, have no ill effects, and almost the only limit to the amount given is that imposed by cost or the need for economy. The second of these considerations is not often given its full weight. Penicillin could be a valuable export if it were not being used somewhat extravagantly and sometimes even unnecessarily.

The success of penicillin stimulated a world-wide search for other antibiotics. Thousands of species of moulds and other micro-organisms have been examined from this stand-point, and many have been found to produce antibiotics, the great majority of which are useless in medicine, usually because they are toxic. About sixty are at least promising, and are now being studied further. One has qualified in every way for chemotherapeutic use. This is streptomycin, discovered by Waksman in the U.S.A. in 1944 as the product of a mould, *Actinomyces griseus*. This substance is less potent than penicillin and certainly not less toxic: its one advantage is that it acts on many bacteria on which penicillin does not. These include the causes of two diseases with which we are unfamiliar in England, plague and tularaemia; a large number of bacilli which may cause cystitis, intestinal and wound infections and occasionally meningitis, and—most important of all—the tubercle bacillus.

It has become widely known through the Press that a new miracle drug has been discovered for treating tuberculosis, and bitter disappointment has been caused, either because it could not be obtained for a particular sufferer, or because it failed to cure. The most heart-rending cases have been those of tuberculous meningitis, a form of the disease which is regularly fatal in about three weeks. All such cases are now being

treated with streptomycin, but this has only been possible for about a year, and before that, appeals were unfortunately being made through the B.B.C. for supplies of the drug which simply did not exist. I heard recently of a child with this disease in India whose father spent almost all he possessed in obtaining supplies from America by air, all to no purpose: the child died. So do the majority of these patients: only about one third survive, and some of these are in a pitiable condition—blind, deaf, paralysed or demented. In certain other forms of tuberculosis the results are better, although by no means regularly so: in one of the commonest forms, chronic tuberculosis of the lungs, they are poor, and in most such cases the treatment cannot be advised.

It will be gathered from this that streptomycin has by no means reached the ideal in the chemotherapy of tuberculosis. The drug has also a grave defect: bacteria can become accustomed to it, sometimes very rapidly, so that it has no further effect on them. The acquired resistance is permanent, and the effect of general use of the drug will inevitably be to breed races of hopelessly resistant bacteria. It may take two, five, or ten years to do this, but by that time we must find a new drug to take the place of streptomycin.

### *The Future*

He would be a bold man who would predict in the midst of these remarkable discoveries where they are eventually to lead. It seemed a little time ago as if the complete conquest of all microbic infection might be in sight. Most people would now take a rather more sober view of the future, and at least count on preventive measures to continue to contribute largely in eliminating certain diseases, tuberculosis in particular. It seems probable that most diseases due to ordinary visible microbes of various kinds will be brought within the scope of chemotherapy, although this is not to say that it will always succeed completely. If, as in tuberculosis, a lot of damage has already been done, this may sometimes be irreparable, and to eliminate the disease is not necessarily to restore the patient to normal health.

But there is another class of microbe which may be considered separately. These are the filterable viruses, the chief characteristics of which are exceedingly minute size and incapacity for growth except in the living body. These cause a great variety of disease, from colds and influenza, measles and mumps, to yellow fever, hydrophobia, infantile paralysis and smallpox. With few and unimportant exceptions, virus diseases are unaffected by any known form of chemotherapy. A discovery which would render this statement untrue is perhaps the greatest which could now be made in the whole of this province of medicine.

MAN WONDERS OVER THE RESTLESS SEA THE FLOWING WATER THE SIGHT OF THE
AND FORGETS THAT OF ALL WONDERS MAN HIMSELF IS THE MOST WONDERFUL
NORMAL
ACTUAL PARTS OF THE BODY MADE TRANSPARENT
CLEVELAND
CLEVELAND HEALTH MUSEUM

The Transparent Man, from the Oberlander Trust, is a life-size model showing the skeletal structure, nervous and circulatory systems, shape and position of the main organs of the body. At the Cleveland Health Museum.

The Dickinson-Belskie models of Human Reproduction shown here are a few of the 100 models in the " Wonders of New Life Room " at the Cleveland Health Museum.

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# THE HEALTH MUSEUM

By Bruno Gebhard, M.D., *Director, Cleveland Health Museum.*

Health Museums are science museums specialising in human biology, personal and public health. They have preventive medicine as their father and health education as their mother. They address themselves more to the people than to the professional groups. Their emphasis is on normal growth and development, on the maintenance of health rather than on disease information and on hygiene of environment. They feature Man and his heredity, his development from his earliest stage to old age. As the present adult generation has received only a scanty biological education the Health Museum introduces Man to himself. Medical Museums feature disease ; Health Museums aim at better health for more people, health being understood as being physically and mentally at ease.

## *Historical Background*

The forerunner of Health Museums were the Museums of Hygiene of the 19th century ; as the Parker Museum of Hygiene (1876), better known as the Royal Sanitary Institute. Here the emphasis was on environmental sanitation and later on control of communicable diseases. Up to World War I, the International Association of Medical Museums did much to promote medical museums to " meet the need of objective and demonstrative teaching." Most of the Medical Museums were really Museums of Pathology. In the United States, the Army Medical Museum (founded in 1862) was leading for many years, having reached its climax under John Shaw Billings. Collections of the Royal Societies of the leading universities and hospitals were part of medical research and medical education—lay education was not of their concern. The famous Sir William Osler Memorial Number, Bulletin No. IX of the International Association of Medical Museums (1926), with its 633 pages, marks the end of a great development.

The Health Museum, as developed in the United States, has a double root. One part is in England. " Medical propaganda " was S. H. Daukes' aim in the Wellcome Museum of Medical Science (opened in 1926). He saw that " education of the public is essential for the successful prevention of disease." In this health campaign the medical museums of the future will play their part, not only in the education of health visitors, nurses, and public health officials, but also in bringing home to the more intelligent section of the lay community the essentials of preventive medicine.

The other part of the root is in Germany. The German Hygiene Museum in Dresden, the International Hygiene Expositions of 1911 and

of 1930-1931—mainly the first one—were the first great frontal attacks against ignorance and superstition, and addressed themselves very successfully to the general public. Specialised museums of child hygiene, industrial health, were established in many countries. Travelling exhibits in railroad cars or later in automobiles, and tent exhibits were features at county fairs. World Fairs in the United States and International Expositions in Europe, of the twentieth century, had elaborate displays of the progress of science in general, the medical exhibits mostly getting the greatest attention.

### *Some General Principles*

The American public respects museums as places where one can find unbiased information ; where nobody tries to ' sell ' anything other than true facts. Even in this country preventive medicine is overshadowed by the services of curative medicine, with great hospitals as their visible expressions. Health Museums can be developed as the natural bridge between curative and preventive medicine, and Health Museums may become the visual representation of public health. Health centres would be a natural location for the activities of a Health Museum. This would be especially true for rural districts and under colonial conditions.

Health Museums are not an accumulation of collections, they are manufactured. They take their subjects from the natural sciences as well as the social sciences. The emphasis is on informal, objective, demonstrative teaching by the eye. " Things seen are mightier than things heard " (Tennyson).

Wherever possible, health exhibits should be of a three-dimensional nature and animated or, even better, allowing visitor participation.

### *The Cleveland Health Museum*

Timeliness of the exhibit's subjects is of great importance. For example, at the opening of the Cleveland Health Museum in November, 1940, one year before Pearl Harbour, we presented an exhibit, Fitness for Defence. During the late autumn of 1941, we displayed the exhibit Health and War in Britain with the help of the British Library of Information. The playing of records of the ' blitz ' over London and Dover was too realistic for some of our visitors before December 7 of that year.

Our " Special Exhibit of the Month " deals with seasonal subjects, as ' Colds ' in the autumn, Infantile Paralysis in July, Hay Fever in August ; or they parallel national educational campaigns as those on Cancer, Venereal Diseases and Tuberculosis. They are on display for only that month which is designated to that special disease.

Our 15,000 feet of exhibit space are located on two floors of a remodelled

three-storey building, each floor having about 13 rooms. The ground floor has a small lecture hall with a seating capacity of 125, used mainly for the showing of films. A classroom seating 50 is used regularly for expectant mother classes and school groups: storage rooms for exhibits, a small kitchen used by women's clubs in connection with monthly meetings, also are found on the ground floor. First floor exhibits deal with Human Biology mainly, under the title "Wonder of Life." Nowhere is completeness strived for, but basic facts are so displayed as to make an impression, to make people think and wonder. The sound of the 'Ceaseless Heart,' a simulated sound effect combined with a flashing light at the rate of 70 times a minute, accompanies the visitor on his trip through the Museum. The 'Transparent Man,' on loan from the American Museum of Health in New York, is still a great attraction. Also on the first floor are exhibits dealing with nutrition under the title "Food for Health." No diseases are displayed on this floor.

At present our second floor exhibits include sections on Dental Health and Care of the Foot. An extensive section under the title "Who is Your Doctor" deals with medical education and the practice of medicine, including the work of the pharmacist, nurse, etc. Also located on the second floor are the monthly "special exhibits." The present one, on loan from the American Medical Association, features Mechanical Quackery.

Health Museum activities centre around exhibition and education, not so much around collection and research; but a good museum will always have to try to include all four elements. The outstanding collection of the Cleveland Health Museum was acquired in 1945 and consists of 100 life-size, three-dimensional models of human reproduction. They represent the life work of Dr. Robert L. Dickinson, aided by Abram Belskie, sculptor.

Our emphasis on visual means of communication does not, of course, exclude the use of the spoken and printed word. Guided tours, followed by one or two short film showings, take place regularly; a five minute radio programme is on the air three times a week; the *Museum News* is published monthly; *Making Health Visible* is published, in its second edition, for professional readers, giving our basic philosophy and illustrating our techniques.

Our visitors come from all walks of life, more than half of them are adults, coming as a family. It is hard to say whether our 40,000 visitors per year represent a reasonable slice of our community—Greater Cleveland has one and one quarter million people. A special study is planned to analyse visitors' reactions and what they really get out of it. We have about 500 groups coming annually, of which two-thirds are students of junior and senior high-schools.

### *Outside Activities*

We do not wait for people to come to the Museum, however, we go to them with our loan and travelling exhibits. Voluntary and official health agencies outside of Cleveland use our loan exhibits at county fairs and at other occasions, or secure duplicates of our exhibits for permanent display.

A health museum should take an active part in all community affairs so far as public health is concerned. Out of our short history, one example might be mentioned. At the request of the Cleveland Welfare Federation, the Museum designed a series of popular exhibits on geriatrics under the title Live Long and Like It. A hobby and handicraft show augmented the educational exhibits with 235 exhibitors ; minimum age for participants was 65 years—the oldest being 89 years of age. More than 1,200 items were on display. It was the general opinion that this participation has helped in ' mental rehabilitation ' of the aged. So successful was the project, that it became an annual affair.

Incorporated mainly for lay education, the Museum is increasingly asked to help in training health educators. Summer courses for Public Health nurses have been instituted. A three-month ' internship ' has seen students not only from the United States but from several other countries.

The granary of the Museum's seeds of knowledge is the studios. There is a great lack of museum technicians generally, and especially for our purpose. Artists who have an educational flair and understanding for scientific accuracy are not easy to find. Most of our exhibits are designed and constructed by our own staff and the demand for exhibits is much larger than we can supply. Graphic material and model making are the main part, also the making of slides and film strips. Plastic material is being used increasingly, the Giant Transparent Tooth being our latest example.

### *The Cost*

How costly are Health Museums? Generally speaking, exhibits are no more expensive than any other medium used in health education. Educational films, being at present a favoured medium, may give some comparative data. A one-reel sound motion picture, in colour, costs at present in the United States, between $30,000 and $45,000. The 1947 budget of our Museum, having fourteen full time personnel, is about $80,000. Like all museums, an endowment securing at least one-third of the budget is a necessity in order to secure stability. In our case, membership dues, contributions from individuals and corporations, secured through the members of our Board of Trustees, are the main sources of our income. There is no reason why official health agencies should not

make the operation of Health Museums a part of their educational activities, provided that a suitable building and necessary remodelling costs are taken care of by a foundation grant or an interested individual.

Health education of the public is never finished. It has to adapt its methods and means to the changing times. Visual communication has many advantages ; seeing is easier and more convincing than limited reading or hearing. Seeing is not only believing, it is also relieving. Many of our visitors have been relieved by what they saw. Health Museums cannot do the whole job of popular education in matters of personal and public health, but they can be a forceful objective demonstration of the ways of better health for more people.

## BIOGRAPHICAL NOTES

GEBHARD, BRUNO — Health Educator, M.D., Rostock (Germany), 1924. With German Hygiene Museum, Dresden, 1927-37 ; Executive Secretary for exhibition "Mother and Child," Vienna, 1928, International Hygiene Exhibition section on Child Health and School Hygiene, Dresden, 1930-31. Consultant for Medical and Public Health Exhibits, New York World's Fair, 1937-40. Director, Cleveland Health Museum. Associate, Western Reserve University, School of Medicine.

JAMES W. HOWIE, M.D., (Aberdeen),—has been interested in problems of experimental infection since 1931. Has now turned his attention to the influence of diet on resistance to infection and is in charge of investigations on this subject at the Rowett Research Institute, Aberdeen. Has been a member of the pathology and bacteriology departments of the Universities of Aberdeen and Glasgow ; during the war served with the R.A.M.C. in West Africa. Later was appointed to the staff of the Director of Pathology at the War Office.

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# NUTRITION AND RESISTANCE TO INFECTION

By J. W. Howie, *M.D., Rowett Research Institute, Aberdeen.*

Can resistance to infection be influenced by diet? The answer to the question put in this way is: "Yes." But this is not enough; because our knowledge of the part played by diet in resistance to infection is small in proportion to our ignorance. For example, the further question may be asked: "What foods increase resistance to infection?" To this, a satisfying answer cannot yet be given; and it is not helpful to offer the safe prescription: "a good mixed diet," because we cannot claim to have discovered all the essentials of a good diet or to know the exact requirements of those that have been discovered.

This position offers a challenge which research workers have accepted with enthusiasm. Two main approaches to the problem have been made: (1) observation of natural infections in man and animals and correlation of their incidence and effects with the diet of the community or herd; and (2) experiments with animals. It is worth outlining what has already been learned and what may be expected from each method of inquiry.

In many communities whose diet was inadequate in some respect a high incidence of infection has been observed. Thus times of famine have been marked by great outbreaks of typhus and relapsing fever; a vegetarian African tribe suffered more infectious disease than another whose diet was chiefly meat, blood and milk; isolated groups of soldiers operating under difficulties of supply which restricted their diet showed a high incidence of skin infections; from 1850, the tuberculosis mortality rate in Western Europe has declined steadily but the falling rate was interrupted by rises during the 1914-18 and 1939-45 wars among peoples whose diet was insufficient; poverty, inadequate diet and infectious disease are regularly found together; and badly fed domestic animals frequently carry a heavy burden of intestinal parasites. These and many other observations of the same kind constitute the *prima facie* case for an inquiry into the part played by diet in determining the resistance of the animal body to disease.

Important and useful as these observations are as a starting point, the evidence they furnish does not amount to proof that diet is a major factor in resistance to infection; because in the world of humans and in ordinary herds of domestic animals it has not yet been possible to isolate the nutritional effect and compare it with other factors known to influence the course of infection—such factors, for example, as heredity, dose of the infecting agent, previous contact with the infection, environmental

temperature, ventilation, observance or neglect of the fundamentals of public health and personal hygiene, and possibly the state of mind. Moreover, we must not close our eyes to some observations in the natural world of man and animals which indicate that good feeding does not ensure freedom from every kind of infection. For example, well-fed, well-favoured, healthy children do not escape the common infections of childhood such as measles and chickenpox—although it is possible that they may suffer fewer complications—and infantile paralysis is not predominantly a disease of the underfed.

In 1918, in the influenza pandemic in Europe, it was said that rapidly fatal cases were distressingly common among young, well-fed soldiers and relatively infrequent in the poorly-fed civilian populations. This impression is firmly held by medical men who served in the outbreak but actual figures do not seem to be available. Therefore, with much of the human evidence, what we have is a strong suggestion that diet may be important and that its influence may depend on the type of infection.

It seems a reasonable guess that diet will exert the greatest influence in infections of long duration, like tuberculosis ; since in these an inadequate diet may favour exhaustion of the body reserves of nutrients essential for suppression of the infection. In human tuberculosis, moreover, when the symptoms subside, we do not talk of ' cure ' but say that spread of the disease has been halted : a precarious balance has been reached between the body defences and the tubercle bacillus and it is in such circumstances that a failure of diet may exert its action. Therefore, it is not surprising that the most suggestive evidence for the influence of diet on human infection concerns tuberculosis ; and, if future research leads us to think that we can define a dietary regime capable of increasing resistance to infection, its influence on the tuberculosis death rate should offer a good test of its value.

### *Experiments with Animals*

Two great advantages are offered by experimental studies with laboratory animals. First we can use animals of the same age, sex, weight and genetic history ; we can control such important matters in their environment as temperature and previous contact with the infecting agent ; and we can use large numbers in small space. If such animals are divided into two dietary groups and one group repeatedly shows a significant difference in resistance to infection, it is permissible to suppose that it is the change of diet that has produced the difference in resistance. The second gain is that we are able to make a direct measurement of the resistance of the animals to the test infection by an absolute and unequivocal criterion : death or survival. Other criteria of resistance or susceptibility, such as changes in weight, skin texture or appetite ; anaemia;

invasion of the blood stream by the infecting agent ; formation of antibodies, and so forth, may all be useful. But none is so exactly measurable or so clear in its meaning as a record of the proportion of survivors after exposure to the infection.

Among the countless experiments that have been done in attempts to define the role of diet in resistance to experimental infection, a disappointingly large number reveal only that the experimenters keenly desired that their experiments would be acceptable as evidence of the relationship they sought to prove. But enough has been firmly established to show that there is a relation between diet and resistance to infection. Thus in one set of experiments the substitution of dried skim milk for oatmeal in a certain diet increased the resistance of mice to salmonella (food-poisoning) organisms. In another, mice fed on a diet of whole wheat, casein, butterfat, salt and chalk were more resistant to the same infection than mice on a diet of bread and pasteurised milk supplemented by an oatmeal-and-buckwheat mixture and dog biscuit. Again with the same infection, mice fed on a diet of wheat and milk were more resistant than mice fed on a diet of chemically defined constituents which was capable of supporting their normal growth and contained all known essential nutrients. It was found that the resistance-enhancing factor was present in the whole wheat. Other gains in knowledge along these lines may allow us to establish which dietary constituents can influence resistance to which infecting agents ; or, more modestly, to measure the influence on different infections of the ' plane of nutrition ' and the state of metabolism.

The complexity of the relationship has been emphasised by the discovery that mice deficient in certain of the vitamin-B factors, as well as undernourished mice, are actually more resistant to certain infections caused by viruses. Likewise, undernourished or hibernating hedgehogs are more resistant to the virus of foot-and-mouth disease. In such animals cell growth and division is reduced ; therefore the observations fit in well with experimental work which has shown that viruses multiply most rapidly in the presence of growing and actively dividing cells. Thus we are warned in advance that it is improbable that anything will be found which increases resistance to all kinds of infection.

Meantime the best experimental strategy is to use small animals to establish as many unequivocal relationships as possible ; next to define the dietary factors responsible and their mode of action ; and finally to see whether we have discovered anything which can improve the advice we have to offer on the feeding of domestic animals and man. If we assume now that what is established for mice may also be true for man we can perhaps be glad that our present flour contains a high proportion of the whole wheat and that there are arrangements to allow extra milk for children and others in special need of it.

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# THE EMOTIONAL DEVELOPMENT OF THE ADOLESCENT

By Doris M. Odlum, M.A., M.R.C.S., L.R.C.P., D.P.M., *Senior Honorary Psychiatrist, Elizabeth Garrett Anderson Hospital, London.*

Adolescence is a gradually developing phase which occupies a number of years. In this country it usually begins somewhere about the age of twelve and is seldom completed before eighteen or nineteen. In other countries the range varies considerably and we have ample evidence that in America the average girl, at any rate, is at least two years more advanced especially in respect of the development of heterosexual interests and emotions. This more nearly corresponds with the conditions existing in the Latin countries but in these the children mature much earlier whereas American boys and girls do not appear to complete their adolescence any earlier than in this country.

## *The Girl*

The psychophysical changes which are typical of adolescence are heralded by an alteration in the child's appearance. Up to this time, girls approximate to boys in their general musculature and have a somewhat boyish appearance, and both retain something of the look of early childhood. But at this period the body of the girl begins to assume a more feminine character and with the onset of menstruation there is a definite rounding of the breasts, a softening of the general contours and a less coltlike and boyish look. Associated with this there is a profound change in the girl's general outlook. She begins to take more interest in feminine things, is less of a tomboy and develops little vanities. She begins to take care of her hair, to think about her complexion ; washing, from being a bore and a waste of time, becomes a recognised necessity ; and she may even begin to want to use powder and lipstick on the sly. She becomes very sensitive about her clothes and is anxious to have the ' new look ' whatever it may be at the moment, so that she may resemble the older girls whom she has a great desire to emulate. These manifestations are less due to a desire to attract the opposite sex than to satisfy her own fantasy picture of herself as a glamour girl. Indeed, in early adolescence her deepest emotions are involved in hero-worship for members of her own sex, a teacher, an older girl and, of course, a film star. Although at fifteen or sixteen if she is out at work she thinks it big to talk about boys and ' dates ' and try to ape the older girls, her real interests are still mostly homosexual and if she does have a flirtation with a boy her main object is

to prove to the other girls that she is attractive and sophisticated. In the case of girls who do not leave school until seventeen or eighteen even this rudimentary interest in the other sex seldom shows itself until about seventeen. The first real love affair even of the most callow and idealistic variety seldom occurs before seventeen or eighteen, and this is usually only a trial trip and it is not until nineteen or twenty at the earliest that the girl begins to experience love in the realistic sense with a view to choosing a life partner and settling down to the responsibilities and joys of a home and family.

### *The Boy*

The development of the boy is often somewhat later than that of the girl. It has been said that up to the age of fourteen girls develop mentally and physically faster than boys, but with the onset of puberty there is a relative slowing down in the case of the girl and a rapid acceleration in the boy so that he tends to outstrip her by the age of fifteen. The physical changes in the early stages take the form of an increased lankiness and there is often a lack of co-ordination in his growth so that he looks as if he did not quite fit himself and appears to be all hands and feet. Emotionally he is still strongly homosexual, regards girls as 'soppy things,' is vastly contemptuous of a love interest in books or films and tries to avoid any overtures that are made to him by the opposite sex. He, too, has his hero worship, frequently for an athletic hero or a younger master or an older boy. He still retains some of the gang spirit of the eleven and twelve year old period, but he begins, as also does the girl, to choose one particular friend to whom he can talk and confide his innermost secrets. The friend changes with considerable frequency but while it lasts each friendship is the one and only.

At puberty the voice begins to break and the muscles become more developed, the hair gets coarser and more masculine in type, and anon appears the miracle of the budding moustache. He, too, develops an interest in his person, and no longer has to be chased to wash behind the ears or teased about the high water mark on his neck. He soon develops a pretty taste in handkerchiefs and ties and by sixteen or seventeen he also begins to think it is big to talk about girls and try to create the impression that he is already a man of the world. Actually his true interest in the other sex often develops later than that of the girl and he does not take any real pleasure in their society until he is seventeen or eighteen and seldom has a serious love affair much before eighteen or nineteen. On the whole, boys tend to mature emotionally later than girls and a possible reason for this is that girls learn to handle their emotions better because they are allowed more free play in this respect than boys. In order that a boy should be thought manly he is taught at a very early age to repress

and distrust his own emotions and to regard the ideal condition as one of pseudo-Stoicism. This tends to delay his emotional development and in unfavourable cases may cause a fixation of certain aspects of his personality at various childish levels.

### *Realisation of Self*

In both sexes one of the most important psychological changes during adolescence is the dawn of the sense of awareness of the self. Up to this age the child accepts itself and its environment without realisation and without question. It may be rebellious or hostile to the world around it but it has no desire or capacity for an investigation into the reasons which underlie its hostility and little or no powers of self criticism. With adolescence all this is changed and the child develops an intense need to understand the reason for things in the outside world and the reason why it feels as it does about them. All this is naturally very disturbing especially as it inevitably involves the development of a critical attitude towards its parents and its home. No sooner does the child begin to make comparisons than it realises that the pattern of its own home and background is different from that of other children and that its parents' views on life and the precepts upon which it has been brought up differ materially from those of other parents. Children are essentially loyal and also essentially honest and sincere, and it frequently causes them great pain and conflict when they have to admit to themselves that the outlook and standards that they find in the homes of their friends are, at least in some respects, superior to those of their own family. It is, for example, a great shock to a child to find that its parents have lower standards of honesty or that they are more quarrelsome, more shiftless and extravagant, or more possessive and dominating than the parents of their friends. Unfortunately in their quest for sincerity the adolescents are usually tactless enough to let the parents see their disapproval, a thing which parents rather naturally resent. It is obviously a shock to them also when their children turn on them and begin to point out the error of their ways. Unless parents are very wise and have considerable psychological insight both in regard to their children's personalities and their own, they will be apt to respond by hostility, sarcasm and the accusation that the children no longer love them. This attitude sadly increases the difficulty of the adolescent who is trying to seek for truth.

It is, of course, of the first importance that parents should, from their children's earliest days, answer their questions truthfully and not put them off with lies or evasions, especially those questions which relate to childbirth or the place of sex in life. Children who have had to come by this knowledge from other sources, usually by means of secret whisperings and sniggerings from other children or nasty minded adults, will never

entirely forgive their parents or wholly trust them. On the other hand, a child who has been brought up with a good standard of values ; who has been given wise sex instruction and guidance at all stages from its earliest years ; whose parents are willing to let it have its head in early adolescence while realising that in many ways it is still only a child and needs their tolerance and protection, has the best chance of passing through adolescence in a normal and happy way so that its emotional development will be well balanced and lead to a mature and harmoniously integrated personality.

## THE DENTAL BOARD OF THE UNITED KINGDOM

The Dental Board of the United Kingdom which was established by the Dentists Act, 1921, have a duty imposed upon them by section 10(1) of the Act to allocate money " to purposes connected with dental education and research or any public purposes connected with the profession of dentistry."

The Board decided that the education of the public in oral hygiene was so important that they appointed a standing committee to deal with the matter. They approached the Board of Education who were favourably disposed to facilitate instruction in the schools, and while other decisions on propaganda were taken simultaneously, the main concern of the Board during the past twenty-five years has been the education of children and parents, and the production of material for the use of teachers, of school dental officers and of others associated with the School Medical Service.

The material produced—posters, leaflets, films, lantern slides, models for school demonstration and for exhibition at Health Weeks—has had wide distribution and use. Some of this material is loaned without charge, but the greater part of it is available free for distribution.

Normal activities were suspended during the war and were not immediately restarted because of the acceptance by the Government, in principle, of responsibility for dental health education. A limited amount of material has, however, always been available from the Office of the Board. In view of legislative delay, the Board have recently approved a new survey of the problem, and the production of some new material.

*The Dental Board of the United Kingdom, 44 Hallam Street, London, W.1. (Tel. LANgham 2804).*

# FILMS

**ELIMINATION (1948). 35 and 16 mm. Black and White. Animation. Sound. 10 mins. Gaumont British Instructional under the supervision of Dr. Winifred Cullis. Director: Mrs. Lacy. Animation: G. B. Animation. For sale or hire from G. B. Film Library, 1, Aintree Road, Perivale, Greenford, Middlesex.**

This is a study of Elimination through the skin, the lungs, the kidneys and the colon.

The technical standard of this beautiful and accurate film is outstanding. The visual flatness of diagram technique is avoided, and the organs are seen 'in the round.' Particularly noteworthy are the details of the skin, the lung air-sac with its capillaries, the transition from a three-dimensional view of the kidney to a section showing details of internal structure and function, and the peristalsis in the colon. The clarity and accuracy of the pictures is matched by an admirable commentary.

This film sets a new standard. It is so good that one hankers after perfection—a slowing down of pace in the section on the kidneys, and a preliminary indication of the purpose of the final section which deals with adjustments in the eliminatory mechanism in hot and cold weather. This, however, is not made clear until nearly the end of the sequence, and it seems probable that others, like the present reviewer, may expect a summary and, being on the wrong tack, may find the pace too quick and lose the thread. Reference to the cooling produced by elimination from the skin might also have been included. These, however, are only minor criticisms of an excellent film.

Suitability: This is definitely a teaching film to be used in class with students having a background of scientific knowledge. It is recommended for First Year Medical Students, the Pre-Nursing Course, Sixth Form Biology or Physiology, and also for Training College Courses in Hygiene. D.G.

**CREATURES OF COMFORT (1948). 35 and 16 mm. Black and white. Sound. 15 mins. Made for the British Gas Council by Realist Film Unit. Director: Alex. Strasser. On free loan from the British Gas Council, 1, Grosvenor Place, S.W.1.**

The film treats of heating and ventilation in relation to health and comfort. It emphasises the constancy of body temperature under ordinary conditions, the body's use of food as fuel and its devices for regulating heat losses. The effects of extreme conditions are shown and also the demands made upon the regulating mechanism by the varying temperatures within the average home. These are compared with the conditions provided by some modern heating and ventilating systems.

The whole approach is light, interesting and amusing. At the same time it is scientifically accurate and sufficiently detailed. The close shots of capillary circulation and the action of the sweat glands are excellent. Throughout the photography is good and clear, and the points are well made.

This interesting film should do much to make people question the discomforts which are too often accepted, and should help to create a demand for better heating and ventilation in the home.

Suitability: This film is recommended for any general adult audience and for youth clubs. It will be valuable for schools and particularly for students taking a Pre-Nursing Course. L.E.H.

# REVIEWS

THE FOOD AND DRINK INFECTIONS. (The Central Council for Health Education. 1948. Pp. 62. Price 4s.)

This Report on the Conference of Food and Drink Infections held by the Central Council for Health Education on October 9th, 1947, can strongly be recommended to all (and there must be many) who are interested in the preparation, distribution and serving of food to the community.

After an opening address by the Chairman, Lord Woolton, there were a series of most excellent papers on the subject by such eminent authorities as Sir William Savage, Professor G. S. Wilson and Dr. Robert Cruickshank, who spoke on the problems of infection, the types of bacteria responsible and their modes of infection, and the methods of food and drink hygiene in the U.S.A. Dr. Lampitt of Messrs. J. Lyons & Co., described the problem as it affected a large firm of caterers, while Dr. Robert Sutherland spoke on the methods of health education. An interesting and lively general discussion followed in which the compulsory pasteurisation of milk was urged. The Report is full of information, advice and interest and is an authoritative work that should be read by all those dealing with the food of their fellow workers.

J. E. Mc CARTNEY.

INTRODUCTION TO PHYSIOLOGY, by W. H. Newton, D.Sc., M.D. (Edward Arnold & Co. 1948. Pp. 284. Figs. 113. Price 7s. 6d.)

This book is an eminently readable introduction to the subject. As the author states in his preface "the book does not pretend to cover the whole of physiology at an elementary level," it does however give a surprisingly wide purview for so small a volume.

The book is intended for beginners of all ages and the author has avoided technical discussions which require an understanding by the reader of physics and chemistry. It is by the elimination of this detail that the author has been able to spread his net so wide. Sufficient experimental evidence is presented to stimulate thought and allow the reader to arrive at his own conclusion.

The approach is original and has much to commend it. The author opens the subject by dealing first with energy production and leads on via temperature regulation to the central nervous system. Many teachers would prefer their students to begin their reading at page 96 and so follow the more formal approach with "The structural and functiontal organisation of the body."

The diagrams are workmanlike though somewhat crude and occasionally inaccurate (as for instance fig. 32) and fall short of the high standard set by the text.

This authoritative introduction to the subject fills a long felt want and will no doubt rapidly achieve the recognition it deserves.

H. P. GILDING.

BASAL MENTAL CONCEPTS—THEIR CLINICAL AND THEORETICAL VALUE, by Edward Glover, M.D. (Imago Publishing Co. Ltd., Nottingham Place, W.1. 1947. Pp. 32. Illus. Price 3s. 6d.)

Edward Glover is known throughout the world as one of the leading psychoanalists in Britain, and is distinguished for his capacity for clear and logical criticism. He has made himself a recognised authority upon the technique of psychoanalysis, and in this monogram he continues to champion the validity of the concepts on which Freud's theories were founded. He demonstrates with admirable clarity the need for a

closer application of standard Freudian disciplines to recent psychoanalytical speculations and trends of thought, regarding especially the reconstruction of early development.

This monogram is written for the expert and would not be understood by those who do not have an extensive knowledge of psychoanalytic theory.

D. R. MacCalman.

Parents Questions, by the Staff of the Child Study Association of America. (Gollancz. 1947. Pp. 282. Illus. Price 10s. 6d.)

The discovery of the unconscious mind and with it the recognition of the importance of early mental development has led to an interest in learning which of the environmental factors influencing the child foster or hinder satisfactory development. It has been found that parental attitudes to the child and the handling during the first developmental phases exert a lasting influence throughout life.

This book is an attempt at influencing parental attitudes so as to allow the most satisfactory outcome for later mental health. It appeared first in 1936 as the result of many years of advisory work with parents, foremost mothers, and this revised edition includes research done during the intervening years. Parents, in attempting to get help for their educational tasks, send in questions to the Child Study Association. In answering these questions much attention is being paid to the possible underlying meaning of the mother's or parents' concern and care is being taken to convey understanding for the child's emotional development as well as giving advice for the handling of a specific situation.

Habits and Habit Training, Discipline and Authority, Attitudes towards Health, Sex in Childhood, School and Home, Parents as People are some of the headings under which questions and answers are given. In as far as the written word can influence attitudes at all, this book is an excellent attempt at conveying modern psychological knowledge to the public in an easily digestible form.

Kate Friedlander

Old Age, by A. L. Vischer. (Allen and Unwin. 1947. Pp. 195. Illus. Price 12s. 6d.)

This is a very valuable and stimulating addition to the rapidly increasing literature on this subject. As director of the Municipal Home for the Aged in Basle the author is one of the pioneers in this field of medicine and the results of his long experience he has here skilfully condensed into a small volume packed with wisdom, knowledge and erudition, and written in a particularly attractive style. It should appeal no less to the lay public than to the medical profession, especially to all those interested in the formation of Old Age Welfare Councils, for the study of the manifold problems created by an increasingly ageing population under rapidly changing economic conditions. These problems are surveyed from many aspects, the purely medical, the historical, the anthropological, and not least the literary. It is not a handbook of geriatrics for use in solving the problems of the consulting room, but rather a volume for the study.

It is divided into an introduction and three main sections: (1) Senescence as a Bodily and Mental Process; (2) The Duration of Life; (3) Society and the Individual: Their Attitude Toward Old Age. These in turn are divided into a series of short sections. The opening chapter on Senescence is particularly well done and sets the very high standard which is maintained throughout. In the few pages 108-114 there is discussed the Maladies of Old Age and The Care of the Aged, and in brief outline is given the solution which has been adopted in Basle for the care of the aged and infirm. The old hospital is retained

for the chronic sick, and the homes for the aged and infirm are within the same grounds or immediately adjacent thereto, so that transference from one to the other is rendered extremely easy. The author deals very trenchantly with the necessity of occupation for the elderly, many of whom are employed on light work about the hospital, even if only for a few hours a day, and for which they get a small remuneration. However well an Old Age Hostel is run, if the residents are entirely unoccupied they sink all the more rapidly into querulousness, decrepitude and decay.

Amongst other things he pleads also for the recognition of Geriatrics as a special branch of medicine, and in addition for the great need of increased and intensive research in this field. The fairly extensive bibliography is not the least valuable part of the book, giving references to much continental literature which has not been available in this country during the last ten years. Altogether a book which adds greatly not only to one's knowledge, but to one's enjoyment.

A. Greig Anderson.

Some Aspects of Physique in Boys and Girls, by R. E. Roper, M.A., M.Ed. (The Research Board for the Correlation of Medical Science and Physical Education, Apothecaries Hall, Blackfriar Lane, E.C.4. 1948. Pp. 24. Illus. Price 2s. 6d.)

The author has made certain measurements on a considerable number of London schoolchildren from the ages of 2 to 16, mostly relating to posture. His figures show sex differences and age changes, as judged by certain undefined standards.

His statistics are largely directed to the frequency of deviations from a hypothetical normal which serves as a standard for comparison. They will unfortunately be useless for comparison with the work of others because he has neither stated the standard which forms the basis of his comparisons nor has he defined the amount of variation which children shall be allowed to exhibit without being regarded as having 'minor defects.' Mr. Roper's comments seem to imply that for him even small variations are minor defects. In this respect the work is misleading since he produces no evidence as to what are the limits of variation beyond which disability is liable to ensue. This is particularly unfortunate since the article has evidently been written for those who have no knowledge of human anatomy or physiology. He would have done well to point out also that the standard of posture which is above criticism at one age may well be different at another age.

Mr. Roper thinks he sees defective foot arches in 72% of boys between 2 and 5, and genu valgum in 72%. Results such as these suggest that his criteria are faulty.

His final recommendations are mainly expressions of opinion regarding welfare in schools. They do not follow as inferences from this investigation. Much better evidence than his would be required for acceptance of his general conclusions regarding the great frequency of 'minor defects.'

A. B. Appleton.

Elementary Home Nursing for the Housewife, by Marjorie H. Miller, S.R.N. (St. John Ambulance Association, St. John's Gate, Clerkenwell, E.C.1. 1947. Pp. 34. Illus. Price 1s. 2d. inc. postage.)

This booklet is intended primarily for housewives, but should also be very useful for nurses who have to advise the public on how to deal with illnesses and minor ailments in the home.

It is attractive and excellently written in the form of four simple talks on the care of old and young patients at home.

M. J. Merry.